Connecting the Systems that Power Education

Event-Driven Transactions in Student Locator

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1. Introduction

Student Locator offers two methods of performing student ID lookups: *batch resolution* and *event-driven transactions*. A batch resolution results in a transaction for each student in the district that does not currently have a valid state-assigned ID. Using Student Locator in this way is ideal at the beginning of the school year or any time an administrator wishes to perform transactions en mass.

For day-to-day operation, however, Student Locator is designed to perform ID lookups in response to real-time events reported from the Student Information System. When a student is added to the SIS, Student Locator automatically creates a transaction for the student without any user intervention. Understanding how this process works with your SIS software is key to maintaining a successful Student Locator implementation.

About This Document

This document is intended to help administrators understand how events are reported by common SIS systems like Pearson Digital Learning's SASI™ product, how they're used in Student Locator, and how to diagnose problems with event-driven transactions.

The information herein applies to the following software products:

- Edustructures Student Locator Agent 1.5.0 and later
- Edustructures SIFWorks® Enterprise ZIS 1.5.1 and later

These SIS systems and SIF Agents are covered:

- Pearson Digital Learning's SASI™ student information system 6.0 and later
- Edustructures SIF Agent for SASI™ 1.5.2 and later

State-Specific Information: Readers will generally receive many of the above products in conjunction with a statewide student ID management project or Schools Interoperability Framework (SIF®) initiative. Some of the information in this guide may differ for your state or school district. Please consult state-specific adjunct documentation, if available.

SIS-Specific Information: Although this guide is intended for users of the student information systems listed above, the general concepts apply to all SIF Compliant SIS products used with Edustructures's Student Locator software. In this guide, each SIS specifically discussed is covered by its own chapter, but not all possible SIS products are covered.

This document assumes a working understanding of Student Locator, the Schools Interoperability Framework, and the software components listed above. The remainder of this chapter provides some background and overview.

SIF_Event Messages and the SIS System

The role of the student information system with regard to Student Locator is two-fold:

1. **Event Reporting.** Track when new students are added to the SIS database and send the appropriate SIF_Event messages in response. Timely, event-driven Student Locator transactions are not possible if the SIS system cannot report the addition of new students to its database in real time.

2. **Event Subscription.** When Student Locator has received a State ID for a student, it reports that ID back to the ZIS as a StudentPersonal Change event. The SIS must subscribe to this kind of event. When received, it should apply the value of the "StatePrId" data element to the student record to update its State ID.

Normally, SIF_Event messages are exchanged between Student Locator and the SIS in the background and require no intervention on the part of a user. Understanding how they work is only important if you need to diagnose why the two systems are not communicating properly. For now, just keep in mind the above requirements of the SIS and note that both are required for a functional system. Consequently, the first step in diagnosing problems with event-driven transactions is usually in the SIS Agent's ability to report SIF_Event messages, or to receive SIF_Event messages once a transaction has completed.

About Event-Driven Transactions

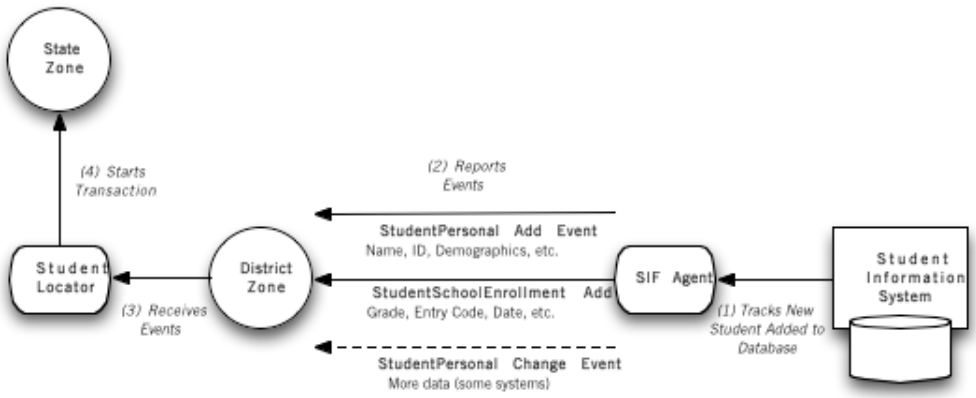
When a new student is added to a SIF Compliant student information system, two things must happen for Student Locator to start a transaction:

1. **StudentPersonal Add Event.** The SIS SIF Agent must report a "StudentPersonal Add Event". This event informs Student Locator that a new student exists. The StudentPersonal object contains student demographic information, including name, ID, birth date, gender, and so on.

2. **StudentSchoolEnrollment Add Event.** The SIS SIF Agent must report a "StudentSchoolEnrollment Add Event". This event informs Student Locator that the student has been enrolled into a school. The StudentSchoolEnrollment object also provides the student's grade level, entry/exit dates and codes, etc.

In some SIS systems, the above objects do not contain enough information for Student Locator to perform a transaction at the time the student is added. In this case, it will wait until more information is received. For example, if you add a student in SASI's **Student** atom, the Add Event generated in Step 1 above only contains the student's name and local ID. It is not until you subsequently *edit* the student that more information is reported to Student Locator, this time in the form of a "StudentPersonal Change Event".

Figure 1 depicts a typical event-driven transaction:



Required Data Elements for an Event-Driven Transaction

Although each implementation is different, most ID management applications and data warehouses require the data elements shown below in order to start a successful Student Locator transaction.

☞ Refer to your state's documentation for state-specific data element requirements.

Data Element	Supplied By Object
Local ID	StudentPersonal
School and District ID	StudentSchoolEnrollment
School Year	StudentSchoolEnrollment
Grade Level	StudentSchoolEnrollment
Social Security Number	StudentPersonal
Name (First, Last, and Middle)	StudentPersonal
Mailing Address	StudentPersonal
Ethnicity Code	StudentPersonal
Birth Date	StudentPersonal
Gender	StudentPersonal
Effective Date	StudentSchoolEnrollment

Event Processing Options

As noted, most SIS systems can provide all requisite data elements by reporting a StudentPersonal Add Event and corresponding StudentSchoolEnrollment Add Event. Other systems may require three or more events to transmit all required data elements.

When more than two events are required, Student Locator can be configured to wait in different ways depending on the SIS system in use. The following options are available and may be changed by opening the Student Locator Console, choosing **File > Global Agent Settings**, then selecting the **Transaction** page:

- **Option 1 – Wait for All Required Data Elements ("Only after enough field information has been obtained").** When this option is selected, Student Locator will begin a transaction in the *Starting…* state upon receipt of the StudentPersonal Add and StudentSchoolEnrollment Add events. It will not progress the transaction to the *Request Issued…* state until all required data elements have been received, possibly through subsequent Change events. (See the "Statuses in SLF" document.)

- **Option 2 – Wait for Add Events ("SP Add and SSE Add Event are received").** When this option is selected, Student Locator will start a transaction upon receipt of a single StudentPersonal and StudentSchoolEnrollment Add event. If one or more required data elements are not received in those two events, the transaction will fail and an administrator will be notified via the usual notification mechanism for failed transactions (e.g. e-mail)

- **Option 3 – Wait for Add Events & Change Event ("SP Add, SSE Add, and SP Change Event are received").** When this option is selected, Student Locator will start a transaction upon receipt of a single StudentPersonal and StudentSchoolEnrollment Add event, followed by a single StudentPersonal Change event. If one or more required data elements are not received in those two events, the transaction will fail and an administrator will be notified via the usual notification mechanism for failed transactions (e.g. e-mail)

  This option is designed to accommodate the way some SIS products work, including the SASI product (when the standard, non-DI enrollment screen is used) and the PowerSchool product (when the standard enrollment page is used). For example, in SASI when a student is added through the SASI Student atom, only the Local ID (*PermNum*) and Name are communicated in the initial StudentPersonal Add event. All other data is sent in a subsequent Change event after editing the student record. Similarly, when a student is added to PowerSchool, the enrollment screen does not include all of the required fields. Thus, Student Locator must wait for three events total before starting a transaction.

☞ The default for your system depends on your SIS and the options chosen for your specific state implementation. In general, you should not change the default unless your district uses the SIS system differently than the default setting was intended.

Option 1 is considered ideal but is not always used because a transaction can wait indefinitely in the *Starting…* state until all data elements have been received, which may never occur. For this reason, most system integrators prefer to use Option 1 or 2 and have a transaction fail with an error message if not enough information was supplied.

2. SASI

This chapter describes options, configuration notes, and diagnostic steps specific to the SASI student information system.

☞ IMPORTANT: Most Student Locator implementations are automatically configured by a "Deployment Wizard" or similar installation program, which fully configures SASI for Event Monitoring as described in this chapter. Under normal conditions it isn't necessary to follow the steps in this chapter except when diagnosing Event Reporting problems or when repairing an installation. Nonetheless, it's important for administrators to understand how and why these changes are made by the Installer, because in the event a SASI instance is upgraded, restored from a backup, or installed fresh at a new school, administrators may need to manually re-enable Event Reporting features.

Event Reporting Concepts

SASI administrators should be familiar with three concepts and database tables used in Student Locator environments:

- Event Monitoring
- Event Transaction Log (AEVT)
- Event Monitoring Configuration Files (AFLM & AFDM)

Event Monitoring

Event Monitoring is a feature of SASI that enables it to track changes to its database and record the results in a journal. This feature is turned off in the SASI application as distributed, and must be enabled prior to using Student Locator. This is done from the sasixp.ini file.

☞ Event Monitoring always occurs at the local school level, even in districts where the District Integration (DI) module is installed. Thus, students entered via DI are not reported to SIF until the student's records reach the local school database (where the changes are tracked by the Task Server component of DI as it updates data files like ASTU and AEVT)

Event Transaction Log (AEVT)

When monitoring is turned on, changes to the database are recorded to the AEVT file ("Event Transaction Log"), according to the instructions in the AFLM and AFDM files ("File Monitoring" and "Field Monitoring").

The SASI SIF Agent periodically polls AEVT to see if there are any new changes recorded since the last polling interval. When a new student is added, for example, several records are written to this file to track changes to the ASTU (student) and AENR (enrollment) files. The SIF Agent converts these records to SIF Events; for example, StudentPersonal Add Events, StudentSchoolEnrollment Add events, and StudentPersonal Change events.

Event Monitoring Configuration Files (AFLM & AFDM)

Those familiar with SASI know its database is comprised of hundreds of files and thousands of data elements. If SASI were to monitor its entire database for changes, it would impact performance and record much more data than needed. Therefore, by design SASI only monitors the specific files and fields listed in the AFLM ("File Monitoring") and AFDM ("Field Monitoring") tables. The versions of these tables included with the default SASI distribution are not compatible with the SIF Agent; consequently, they must be repaired prior to use.

Event Reporting Configuration

How to Enable Event Monitoring

Event Monitoring must be enabled at each SASI instance. Follow these steps:

1. Open the sasixp.ini file in a text editor like Notepad. This file is found in the directory where SASI is installed at each school.

2. Locate the [Monitoring] section, usually at the end of the file. If the section does not exist, create it exactly as shown below. If the section does exist, verify that each line has the same spelling (case is sensitive) and value as indicated below, and that no lines are prefixed with a semi-colon.

   ```
   [Monitoring]
   UseMonitoring = True
   UseEnrMonitoring = True
   UseAttendMonitoring = False
   ```

3. Save the file

4. All SASI users must exit the SASI application and log in again for the changes to take effect. (You can save time by doing this after completing all steps in this chapter.)

In addition, the AEVT file must be created at each school. AEVT is a non-qualified dBase IV file, so it always exists at the root of the "datafile" folder. You may use either of the following methods to create this file:

- **Method A – File Definition Process.** From SASI, open the Create New Files atom from the File Management group. Mark the Use Database Definition checkbox. Highlight the "AEVT – Event Transaction Log" item in the list and click the Create button.

- **Method B – File Copy.** Use the above procedure to create the AEVT files (aevt.dbf and aevt.mdx) at one school. Copy these files to the "datafile" folder of all other schools. Remember that AEVT is a *non-qualified* dBase IV file (e.g. it does not include a school year or number in the filename) and resides at the root of the "datafile" folder. If your district uses the Qualified Data Files feature of SASI, only one copy of this file is needed rather than one per school.

How to Configure the AFLM & AFDM Files

The AFLM and AFDM files must be configured – or "repaired" – for SIF at each SASI instance. Follow either method below to analyze and repair these files.

- **Method A – SASI Agent Tool.** Open the SASI SIF Agent Console and choose SASIxp Event Monitoring… from the Tools > Diagnostic Tools menu. In the dialog box that appears, click the Start button to analyze the AFLM and AFDM files at each school. If the Status column indicates "Needs Repair" for any school, mark the "Repair the configuration if needed" check box and again click the Start button. This time, those files that are outdated will be repaired.

  NOTE: If repairs are made, the AFLM and AFDM files must be Reorganized in SASI from the **File Management > Reorganize Files** atom. Further, all users must exit and restart the SASI application for the changes to take effect. This is because SASI loads its event monitoring configuration from these files only when it starts up; any changes subsequently made to the files will not be noticed until the next time the application runs.

- **Method B – File Copy.** Use the above procedure to repair the AFLM and AFDM files at a school, then copy those files to the "datafile" folder of all other schools. Re-

member that AEVT is a *non-qualified* dBase IV file (e.g. it does not include a school year or number in the filename) and resides at the root of the "datafile" folder. If your district uses the *Qualified Data Files* feature of SASI, only one copy of this file is needed rather than one per school.

☞ IMPORTANT: Some statewide deployments include AFLM and AFDM files on the Student Locator CD-ROM. These files may have been specially prepared to meet the needs of your district. Check with your state-specific documentation to determine if you should use the AFLM and AFDM files from CD-ROM in favor of repairing them as described above in Method A.

How to Change the SIF Agent's Event Polling Interval

You can control how often the SASI Agent polls the AEVT file by following these steps:

1. Open the SASI SIF Agent Console
2. Choose Settings… from the Tools menu
3. Navigate to the SIF Messaging node in the tree and choose a polling frequency from the drop-down list

For example, a polling interval of an hour means the SASI Agent will process all pending items in the AEVT file, then wait 60 minutes before again checking the file for new entries. Consequently, it might take an hour or longer for a new student added to the SASI application to be reflected in Student Locator.

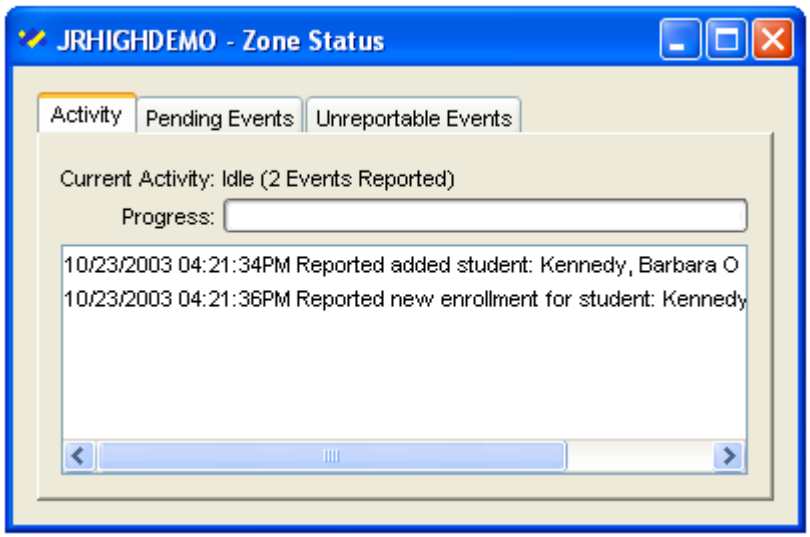
Keep in mind the SASI Agent must read the AEVT file from each school over the network, which can cause bursts of network traffic (especially if the AEVT files are not routinely Reorganized from SASI and allowed to grow to several megabytes in length). For most sites, we recommend choosing an interval no less than 30 minutes.

Event Reporting Status

Since event reporting happens in the background, it is not always obvious if it is working properly. One helpful tool for SASI users in diagnosing problems with event-driven Student Locator transactions is the SIF Agent Console. Follow these steps to view the status of event reporting for each school zone:

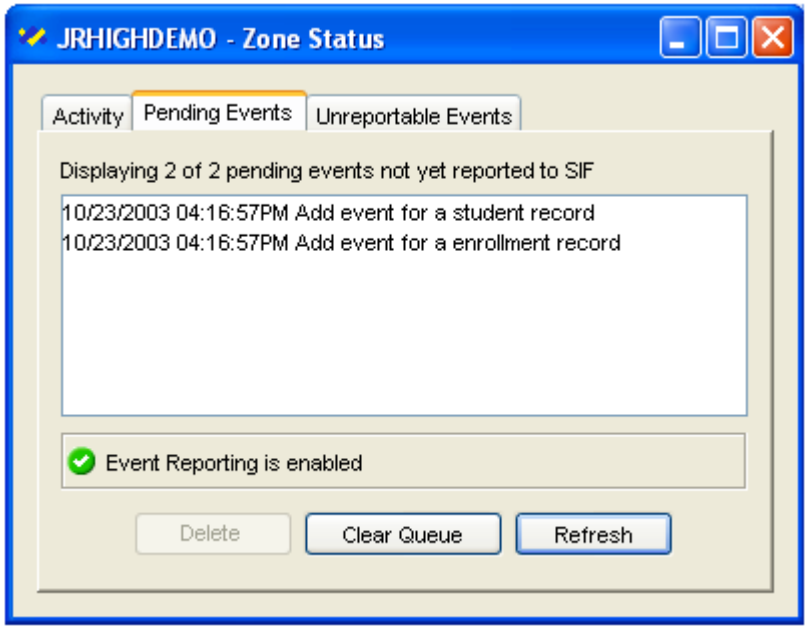
1. Open the SASI SIF Agent Console
2. Highlight a school zone in the list and choose Zone Status… from the Zone menu (or simply double-click the zone)

The **Activity** tab shows all events that have been reported to the ZIS for this school zone since the agent was started. If you know a student was added to SASI and want to make sure it was picked up and reported to the ZIS by the SIF Agent, this is a good place to do that. (See also the previous section regarding the event polling interval.)



A running copy of what's shown on this tab is kept in the agent's \logs\{zone}\activity.log file.

The **Pending Events** tab shows the contents of the AEVT file for this school. These events have not yet been reported as SIF Event. Note you can selectively delete pending events from here (or clear the entire queue), view the status of Event Reporting on this zone, and in the case of error, view the details that have caused Event Reporting to be stopped or suspended.



If you know a student was added to SASI and want to immediately double-check that it was tracked in the AEVT file, this is a good place to do that. (You won't have to wait until the next reporting interval, as would be the case when viewing the Activity tab).

If the main window indicates that event reporting is "suspended", this tab will show the cause. Click the Details… button. When in an error state, Event Reporting tries to automatically resume every 5 minutes; you can force it to resume by clicking the Restart button. This design of suspending Event Reporting when an error occurs is intended to let the agent recover from problems associated with the network

The **Unreportable Events** tab shows entries from the AEVT file that could not be successfully reported as SIF Events because of an unrecoverable error. This tab should always be empty; if you notice content in it, it probably indicates corrupt data in the AEVT file, an unexpected problem with the software, or some other condition that the agent deemed "unrecoverable". Note unreportable events are logged and then removed from the AEVT file to prevent it from blocking subsequent events in the queue.

Note a running copy of what's shown on this tab is kept in the agent's \logs\{zone}\Unreportable Events.log file

☞ For more information on please read the "Zone Status" section of The Console chapter in the Edustructures SIF Agent for SASI User's Guide

Environmental Considerations

Network Access Rights

For event reporting to work properly the agent must be able to periodically read from the AEVT file in each school's "datafile" folder. Ensure the user account under which the SASI SIF Agent is running has full read and write permissions to that directory over the network. In many cases – particularly in an environment with mixed NetWare and Windows networking – these rights must be specified for the actual user and folder, not just inherited from a group or role.

☞ Edustructures typically recommends that a single "SIF Account" be created at the server running the SASI SIF Agent, and that this account be given full read and write permissions to each SASI datafile folder throughout the district network. This ensures consistent a consistent policy and permissions setup. Note the agent must run under this account. This means when executed as a standalone program, the account you're logged in as should be this "SIF Account", and when executed as a Windows Service, the service must be configured to run from this account.

Event Reporting & the District Integration (DI) Module

When the SIF Agent is used with District Integration, events are not reported until changes are made at the local school level. The SIF Agent does not monitor changes to the central DI database.

Reorganizing the AEVT File

Each time the SIF Agent processes a record from the AEVT file, it marks it as deleted. These deleted records are not actually removed from the file until you use the Reorganize command in SASI. As the file continues to grow in size, it will take more time for the SIF Agent to process it. For this reason we recommend routinely reorganizing the AEVT file for improved performance (e.g. once per month).

Upgrading SASI & Installing New Instances

When upgrading the SASI application to a new version, the updater may overwrite the AFLM, AFDM, and sasi.ini files described earlier. This could impair SIF-based event

monitoring and reporting because those files may not longer be properly configured. We recommend saving a working copy of these files before performing an upgrade, then replacing them after the upgrade. If event-driven transactions stop functioning after a SASI upgrade, replacement of these key files is the likely cause.

Diagnosing SASI-related Event Reporting Problems

These diagnostics are specific to the SASI student information system.

Problem	Possible Solutions
Problem 1. New Students do not result in Student Locator transactions	**Solution A.** This is a common symptom of disabled Event Monitoring. See "How to Enable Event Monitoring" on page 8. Remember all users will need to exit and restart SASI if any changes were made to the sasixp.ini configuration file. **Solution B.** This is a common symptom of AFLM and AFDM files needing to be repaired. The version of these files distributed with the SASI application may result in some SIF Events reported when a new student is added, but until the files are repaired, the full set of StudentPersonal Add and StudentSchoolEnrollment Add events will not be generated by the SIF Agent. See "How to Configure the AFLM & AFDM Files" on page 9. Remember these files will need to be Reorganized, and all users will need to exit and restart SASI, if any repairs were made.
Problem 2. New Students result in Student Locator transactions, but it takes a lot longer than I'm expecting	**Solution A.** The Event Reporting frequency in the SASI SIF Agent may need to be reduced. See "How to Change the SIF Agent's Event Polling Interval" on page 10. Keep in mind the more frequently the agent checks the AEVT file, the more network traffic will be generated. We recommend keeping this setting at 15 minutes or more.
Problem 3. New Students result in Student Locator transactions, but they never leave the *Starting…* state	**Solution A.** Open the Student Locator Console and choose File > Global Agent Settings. Navigate to the Event Reporting node in the tree and verify the selected option. If you enter students from the Student atom in SASI. Option 2 or 3 should be selected. See "Event Processing Options" on page 6 for details.